Molecular Biology

FUNCTIONAL ANALYSIS OF THE HUMAN RAC2 GENE PROMOTER

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Rac2, a ras-related low molecular weight GTPase of the Rho family, is an important regulator of the NADPH-oxidase complex and is highly expressed in myeloid cells. The NADPH-oxidase complex is necessary for the microbicidal activity of phagocytes. The hematopoietic tissue-specificity and regulatory role of *Rac2* in the formation of the NADPH-oxidase complex make it a prime target for research. The murine proximal promoter region of the *Rac2* gene was found to contain an Sp1/Sp3 binding site believed to be an important regulatory element for the transcription of *Rac2*. Analysis of the murine promoter showed full promiscuous activity of the promoter upstream of the Sp1/Sp3 site, and significantly less activity following truncations that eliminated the Sp1/Sp3 site or after specific mutations were made to the Sp1/Sp3 site. This study focused on the human *Rac2* promoter. A truncation of the proximal promoter that eliminated the Sp1/Sp3 binding site was subcloned into a luciferase reporter vector. Transient transfections followed by luciferase and β-galactosidase assays indicated that the human *Rac2* promoter does not mimic the murine *Rac2* promoter in respect to the Sp1/Sp3 binding site regulating transcription. The short promoter lacking the Sp1/Sp3 site still exhibits strong transcriptional activity. More studies are currently being conducted employing various truncations of the human proximal promoter in order to compare the murine and human promoter activities more completely.